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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/079,472	02/19/2002	Maitreyee Mahajani	40025-005	6706

27966 7590 10/22/2002

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EXAMINER

LE, THAO X

ART UNIT PAPER NUMBER

2814

DATE MAILED: 10/22/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/079,472

Applicant(s)

MAHAJANI ET AL.

Examiner

Thao X Le

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 July 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.

- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-7, 16-19, 23 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6190949 to Noguchi et al in view of Pub 2002/0039822 to Kusumi et al.

Regarding to claims 1, 16, 23, 25 Noguchi discloses a method for making thin fin transistor (TFT) containing a gate dielectric structure, fig. 7A-8, comprising: providing a substrate 20; and providing an oxide layer 23, column 12 line 4, of the gate dielectric structure on the substrate.

But Noguchi does not disclose the oxide layer is formed by an in-situ steam generation (ISSG) process.

However, Kusumi reference discloses the oxide layer 39, is formed by an ISSG process [0534]. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to use the ISSG oxide 39 layer teaching of Kusumi to replace the oxide layer 23 of Noguchi, because it would have created a superior quality oxide layer as taught by Kusumi, [0214].

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Regarding to claims 2-3, Noguchi discloses a method for making TFT wherein the substrate comprises a gate conductor 22 on a glass substrate 20, column 12 line 1, wherein the TFT is a floating gate 37 transistor; fig. 12.

Regarding to claims 4-7 and 17-19, Noguchi does not disclose the method wherein the ISSG process flows hydrogen and oxygen over the substrate, at a temperature ranging from about 750 to about 1050 °C, at a pressure ranging from 100 millitorr to about 760 torr, and having a thickness of 10 to 200 angstrom.

But Kusumi discloses a method for making a thin film transistor wherein the ISSG process flows hydrogen and oxygen over the substrate, at a temperature ranging from about 900 to about 1100 °C, at a pressure ranging from 1000 Pa to 2000 Pa (7.5 – 15 Torr), and having a thickness of 50 to 150 angstrom (5 nm to 15 nm) [0528]. At the time the invention was made; it would have been obvious to one of ordinary skill in the art to use the process conditions teaching of Kusumi to replace the oxide layer 23 of Noguchi, because it would have created a superior quality oxide layer as taught by Kusumi, [0214].

3. Claims 8, 15, 20 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6190949 to Noguchi et al. and US Pub 2002/0039822 to Kusumi et al., and further in view of US Patent 6,362,085 to Yu et al.

Regarding to claims 8, 15 and 20, Noguchi and Kusumi do not disclose a method for making a TFT wherein further including annealing oxide layer in a nitric oxide atmosphere. However, Yu reference discloses the annealing the oxide layer in the nitric oxide atmosphere, column 1 line 55. At the time of the invention was made; it would

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have been obvious to one of ordinary skill in the art to combine the annealing oxide in nitric atmosphere teaching of Yu with Nogichi and Kusumi, because it would have increased the dielectric constant and improved the hot carrier hardness of the oxide layer, column 1 line 49-58.

Regarding to claim 22, as discussed in the above claims, Nogichi, Kusumi and Yu disclose all the limitation in claim 22.

4. Claims 9-14, 24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5324675 to Hayabuchi in view of Pub 2002/0039822 to Kusumi et al.

Regarding to claims 9, 24 and 26, Hayabuchi discloses a method for making a semiconductor device, comprising: providing a substrate 1, and providing a gate dielectric structure by providing a first oxide layer 3, fig. 6, on the substrate, providing a nitride layer 4 on the oxide layer 3, and providing a second oxide layer 5 on the nitride layer 4, fig. 6, column 3 lines 53-67.

But Hayabuchi does not disclose the method wherein the first oxide layer is formed by ISSG.

However, Kusumi reference discloses the oxide layer 39, is formed by an ISSG process [0534]. At the time the invention was made; it would have been obvious to one of ordinary skill in the art to use the ISSG oxide 39 layer teaching of Kusumi to replace the oxide layer 23 of Noguchi, because it would have created a superior quality oxide layer as taught by Kusumi, [0214].

Regarding to claims 10-14, Hayabuchi discloses the method wherein the semiconductor devices is a ONO transistor, fig. 6.

But Hayabuchi does not disclose the method wherein the ISSG process flows hydrogen and oxygen over the substrate, at a temperature ranging from about 750 to about 1050 °C, at a pressure ranging from 100 millitorr to about 760 torr, and having a thickness of 10 to 200 angstrom.

However, Kusumi discloses a method for making a thin film transistor wherein the ISSG process flows hydrogen and oxygen over the substrate, at a temperature ranging from about 900 to about 1100 °C, at a pressure ranging from 1000 Pa to 2000 Pa (7.5 – 15 Torr), and having a thickness of 50 to 150 angstrom (5 nm to 15 nm) [0528]. At the time the invention was made; it would have been obvious to one of ordinary skill in the art to use the process conditions teaching of Kusumi to replace the oxide layer 23 of Noguchi, because it would have created a superior quality oxide layer as taught by Kusumi, [0214].

### ***Response to Arguments***

5. Applicant's arguments with respect to claims 1, 3-7, 9-19, and 23-26 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

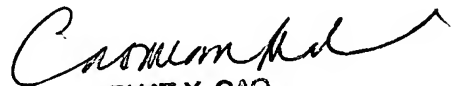
6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thao X Le whose telephone number is 703-306-0208. The examiner can normally be reached on M-f from 8:00 AM - 4:30 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael M Fahmy can be reached on 703-308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Thao X. Le  
October 17, 2002

  
PHAT X. CAO  
PRIMARY EXAMINER